

Laparoscopic repair for recurrent inguinal hernia after previous laparoscopic approach

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Received: 8 June 2020

Accepted: 2 July 2020

Published: 24 December 2020

The Egyptian Journal of Surgery 2020, 39:1014–1019

Background and aim

Relaparoscopic repair of recurrent inguinal hernia carries a lot of challenges. The encountered complex surgical technique is assumed to have greater possibilities of surgical complications with consequent higher recurrence rates. The aim of this study was to evaluate the feasibility, safety, and reliability of laparoscopic approach for recurrent inguinal hernia after previous laparoscopic repair.

Patients and methods

Records of 33 patients with 34 recurrent inguinal hernias after previous laparoscopic management have been retrospectively revised. The performed procedure for second repair was transabdominal preperitoneal repair for all the cases. Data of perioperative complications, immediate postoperative course, and hernia recurrence were collected and analyzed.

Results

No intraoperative complications were encountered. Postoperative pain was recorded as moderate. The mean follow-up period ranged from 14 to 40 months with a mean of 24.82 ± 6.9 . During the follow-up period, three (9%) cases developed groin seroma and one (3%) case had transient thigh numbness. Of the patients, 85% returned to normal daily activities within 14 days postoperatively. Two patients had recurrence of the hernia and they were managed by Lichtenstein repair.

Conclusion

Relaparoscopic repair of recurrent inguinal hernia is safe and applicable. The procedure should be performed with experienced hands.

Keywords:

recurrent inguinal hernia, relaparoscopic hernia repair, transabdominal preperitoneal

Egyptian J Surgery 39:1014–1019
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1110-1121

Introduction

Globally, ~20 million patients undergo groin hernia repair annually [1]. Surgical treatment of inguinal hernia can be achieved via open or laparoscopic approach [2]. Since its introduction in the 1990s, laparoscopic inguinal hernia repair by the two approaches transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) has become the procedure of choice in surgical practice by a lot of surgical institutes [3]. Among all the factors used to compare the various repair procedures of inguinal hernia, the incidence of recurrence is considered the most important factor as a measure of success of the procedure [4,5]. One of the crucial steps in the management of recurrent hernia is the choice of the optimal strategy and surgical technique [6]. Surgery for the resulting recurrent hernia is a hard mission. There is weakened tissue and challenging dissection due to obscured and distorted anatomy and dense fibrotic scar tissue by the previous surgery [7]. It was recommended to perform anterior mesh repair for a recurrent hernia after previous posterior repair due to the increased risk of complications associated with the repeated posterior approach [8]. The surgeon will be offered the feasibility to explore virgin tissue planes with easier dissection. However, this approach will lack the

advantages of minimally invasive procedures namely lower rates of postoperative pain, shorter postoperative recovery, rapid return to normal activities, and a lower incidence of infections [9]. A number of studies have been conducted to address the use of relaparoscopic repair for recurrences after previous laparoscopic repair, and their findings indicate that there is a place for relaparoscopic surgery in the treatment of such condition [5,10].

The aim of the study was to evaluate our institute's experience regarding the feasibility, safety, and reliability of laparoscopic approach for recurrent inguinal hernia after previous laparoscopic repair.

Patients and methods

Thirty-three male patients with 34 recurrent inguinal hernia after previous laparoscopic repair had undergone relaparoscopic repair at the Surgery Department,

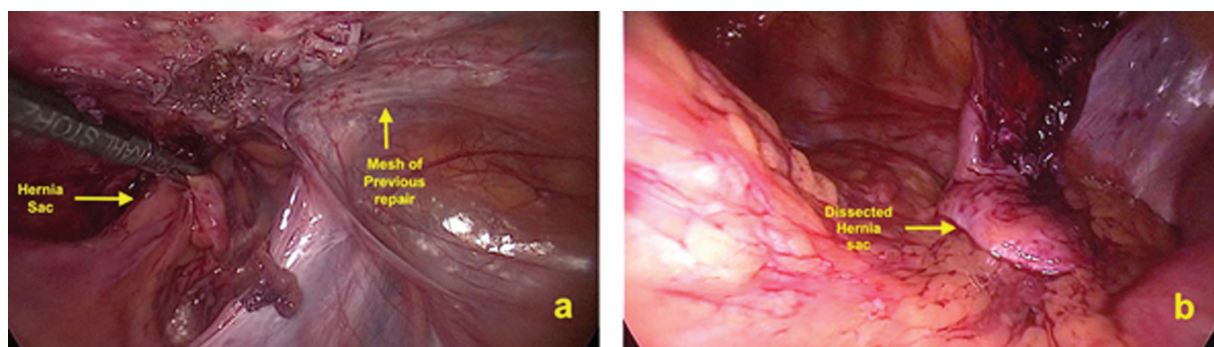
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Faculty of Medicine, Menoufia University throughout the period from 2012 to 2017. The study was approved by the ethics committee of the institute. A written consent has been obtained from all patients before surgery. Records of these patients were retrospectively revised regarding patients' demographic features and the type of primary laparoscopic procedure. All the included patients with recurrent hernia were subjected to TAPP repair. The used protocol of our institute had been followed in all patients. The protocol instructs all the patients to evacuate the bladder before the operation. A dose of intravenous antibiotics was routinely administrated with induction of anesthesia. Insertion of a 10 mm trocar just above the umbilicus was performed by the open technique and then abdominal insufflation and insertion of the camera were done. Two operating 5 mm trocars were inserted under vision at the lateral side of both recti muscles. The port on the side of the hernia was inserted 2–3 cm above the umbilical transverse line, while the

other (on the opposite site of the hernia) was inserted slightly caudal to this line. After abdominal exploration and exploration of both inguinal regions, the hernia site was detected with reduction of the contents, if any. Peritoneum was transversely incised at about 5 cm above the hernial orifice with dissection of the upper and lower peritoneal flaps. Hernial sac was carefully dissected from the spermatic cord. Removal of the previous mesh had not been attempted (Figs 1 and 2). Complete dissection with identification of anatomical structures was performed creating an adequate space for mesh fixation. Then, a 10×15 cm polypropylene mesh was introduced to the field and mesh fixation using an Endotaker was performed after tailoring to the anatomical site (Fig. 3).

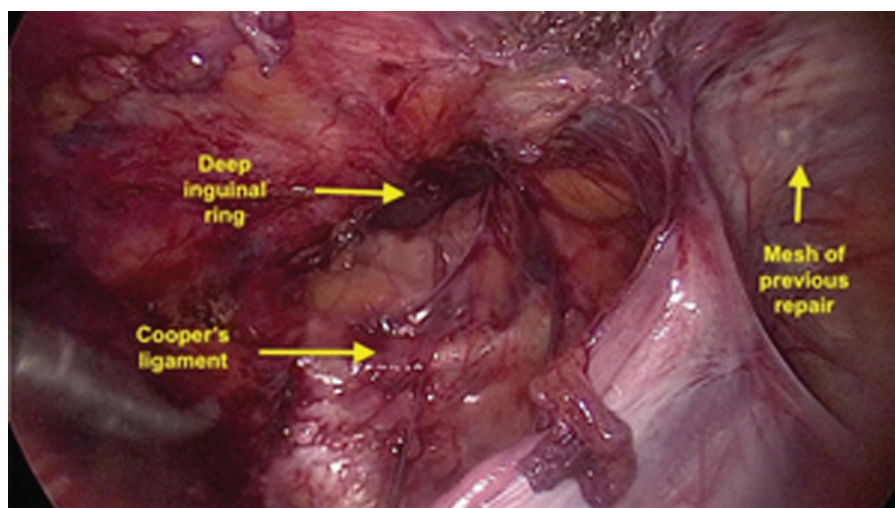
Records of operative time together with the encountered intraoperative complications or conversion to open were revised. Assessment of intensity of postoperative pain was performed by the numerical rating scale from 0 to 10. Data about

Figure 1



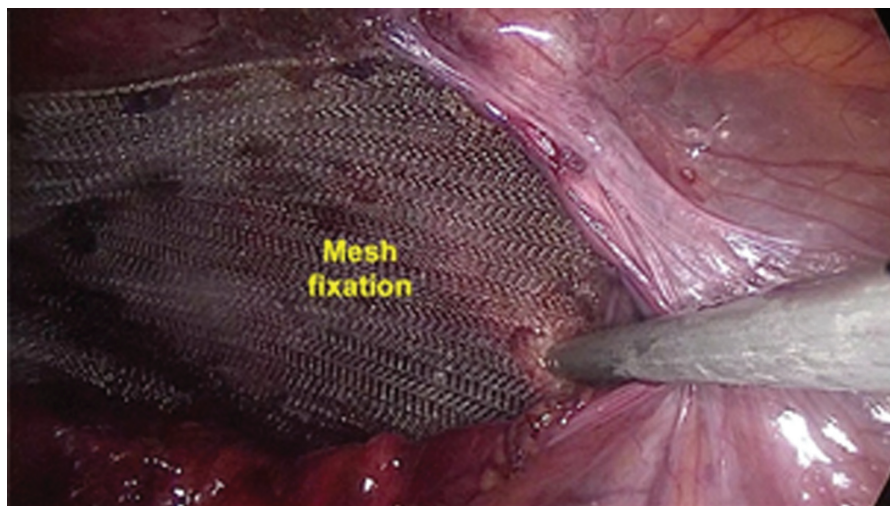
Right indirect inguinal hernia: (a) hernia sac, (b) dissected sac.

Figure 2



Identification of anatomical landmarks (right side).

Figure 3



Mesh fixation.

immediate postoperative course, postoperative analgesia, immediate postoperative complications, and length of hospital stay were recorded. Throughout the time for follow-up, long-term complications as well as rerecurrence of the hernia were recorded.

Results

The age of the included patients in the current study ranged from 27 to 58 years with a mean of 40.65 ± 8.12 . All the included patients were men. Of the 33 included patients, one patient presented with recurrent bilateral hernias. Previously used procedures were TEP in 19 (56%) hernias and TAPP in 15 (44%). The interval between primary laparoscopic repair and the start of symptoms indicating hernia recurrence ranged from 2 to 14 months with a mean of 6.3 ± 3.14 . During relaparoscopic operative exploration, there were 24 (70%) indirect inguinal hernias and nine (26%) direct inguinal hernias. One (3%) case was found to have femoral hernia. The main difficulties encountered during surgery are difficult dissection due to extensive adhesions and the challenge in identifying the important anatomical structures such as vas deferens and gonadal and inferior epigastric vessels. The previously applied mesh was found attached to the peritoneum close to the hernia site and has been left in place with no attempt for removal (Table 1).

The mean operative time was 60.3 ± 11 min that ranged from 45 to 80 min. No cases required conversion to the open technique. Neither major intraoperative complications nor injury to vital structures were encountered. Immediate postoperative course was

Table 1 Previous surgical procedure and encountered types of recurrent hernia

	<i>n</i> (%)
Previous surgical procedure	
TEP	19 (56)
TAPP	15 (44)
Type of encountered hernia	
Indirect hernia	24 (70)
Direct hernia	9 (26)
Femoral hernia	1 (4)

TAPP, transabdominal preperitoneal; TEP, totally extraperitoneal.

smooth in all the included patients. According to the 0–10 pain numerical rating scale, the patients experienced their pain to range from 2 to 7 with a mean of 4.26 ± 1.26 . Consequently, it was overall categorized as moderate pain, and none of the patients required postoperative opioids. Administration of NSAIDs was satisfactory to control postoperative pain in all the patients. Urine retention was recorded in two patients. It was managed conservatively in one patient; however, urinary catheterization was performed for the other. These two patients were discharged on the second postoperative day; however, the rest of the patients were discharged within the same day of operation. Short-term follow-up of the cases showed occurrence of seroma in three (9%) patients. Seromas were presented clinically as inguinal swellings. One case was managed conservatively, while the other two cases were managed by ultrasound-guided aspiration. Transient ipsilateral thigh numbness was encountered in one case that was managed conservatively with full recovery after 4 months. Eighty-five percent of the patients resumed their daily life activities within 14 days postoperatively (range, 7–21 days with a mean of 11.76 ± 4.3). The long-term follow-up ranged from 14 to 40 weeks postoperatively with a

Table 2 Operative and early and delayed postoperative data

	<i>n</i> (%)	Range	Mean
Operative data			
Mean operative time		45–80 min	60.3±11 min
Intraoperative complications	None		
Conversion to open	None		
Early postoperative data			
Pain scale		2–7	4.26±1.26
Urine retention	2 (6)		
Seroma formation	3 (9)		
Thigh numbness	1 (3)		
Return to daily activity		7–21 days	11.76±4.3
Delayed postoperative data			
Follow-up period		14–40 weeks	24.82±6.9
Recurrences	2 (6)		

mean of 24.82±6.9. Throughout this period no complications were recorded such as testicular atrophy or hydrocele. However, two (6%) cases encountered rerecurrence of the hernia and were managed this time by anterior open Lichtenstein approach (Table 2).

Discussion

The optimal technique for repairing recurrent inguinal hernia remains a great concern because of the high risks of complications and recurrence [11]. With a review of guidelines for hernia repair, Kockerling and Simons [12] concluded that recurrent inguinal hernia after previous open repair should be repaired in a laparoendoscopic approach and after previous laparoendoscopic repair in the Lichtenstein technique. Laparoscopic inguinal hernia repair is a technically advanced laparoscopic procedure. A varying number of cases ranging from 40 to 250 has been quoted by numerous studies to be mandatory for acquiring sufficient technical expertise [13,14]. Moreover, the laparoendoscopic approach for recurrence following a previous TEP or TAPP demands widespread experience of minimally invasive inguinal hernia surgery and is categorized to be a more complex situation [1,15,16]. Realizing this crucial fact, our institute has started practicing this complex technique, namely, relaparoscopic hernia repair, only after a steep up of the learning curve that started in 2006. Consequently, a gap of 6 years was quite enough to gain the sufficient competency of dealing with recurrent hernia laparoscopically after previous laparoscopic approach.

Success of groin hernia repair is measured primarily by the permanence of the operation, fewest complications, minimal costs, and earliest return to normal activities [4]. It continues to be a matter of debate, whether TEP or TAPP, for the treatment of recurrent inguinal hernia repair is associated with worse outcomes. Gass *et al.* [17] showed in their study that intraoperative complications

were significantly higher in patients undergoing TEP with longer operating hours, but with a shorter length of hospital postoperative stay. On the other hand, Kockerling *et al.* [18] showed that postoperative surgical complications were more observed in TAPP compared with TEP with no other significant differences regarding other aspects including reoperation rates. However, some other studies have shown equivalent results with no significant differences comparing TEP and TAPP concerning intraoperative or postoperative outcomes and recurrences [19,20]. Based on lack of valid significant differences between either procedure, only TAPP was the performed procedure in the current study as per the agreed protocol within our department.

A number of factors contribute to the recurrence of an inguinal hernia. They can be classified into patient related, and surgeon and technique related. Patient-related factors include general factors such as family history, increased age, obesity, chronic constipation, and chronic liver and kidney disease, while local factors include direct, sliding, or bilateral hernia or hernia more than or equal to 3 cm in size. Surgeon-related and technique-related factors include surgeons with less experience, inadequate dissection, under tension repair, and inappropriate selection of mesh type, size, or way of fixation [21]. For recurrence after laparoscopic hernia repair, there is a strong evidence that it is mainly due to technical errors such as small mesh size and mesh migration or insufficient fixation [5]. All meshes are known to contract and shrink in size. Hence, selection of a mesh size that provides inadequate overlap is associated with increased recurrence [21]. In this study, establishment of the proper mesh size with appropriate fixation with tacks were essential steps in all the cases. Yet, it has been assumed that nerve damage may be induced by applications of tacks either directly or indirectly, by

fibrosis around the tacks which can go on to involve the nerves [22]. This has motivated many researchers to find an alternative to tack fixation, either by fibrin glue [23,24], or even nonfixation at all [22,25], aiming at decreasing the incidence of chronic groin pain. Application of these methods has shown significant less postoperative pain, operative time, and cost. Although studies yielded comparable efficacy with mesh fixation including recurrence rate, none of them has explored these techniques in recurrent hernias. Their application was limited to primary noncomplicated hernias. Consequently, mesh fixation was the routine to be used in this study with some precautions to decrease the incidence of postoperative and long-term chronic pain. Minimal possible tacks were used, with fixation medially at the Cooper ligament and laterally at the level of the anterior superior iliac spine. Additional tacks were placed above the level of the iliopubic tract as the nerves are mostly below this level [22]. In this study, only one (3%) case experienced chronic thigh numbness that spontaneously resolved after 4 months. This overall percentage is quite lower than the that recorded by other authors [26–28], who reported that the incidence for the development of chronic groin pain after laparoscopic to range from 7.6 to 11%.

Every time hernia repair is repeated, there will be a higher risk of recurrence [5]. In the current study, rerecurrence was encountered in two (6%) cases. In contrast to van den Heuvel and Dwars [10], Ertem *et al.* [5], and Ferzli *et al.* [29], no rerecurrences were encountered in their studies on relaparoscopic repair for inguinal hernia, while other studies by Kockerling *et al.* [30] and Bisgaard *et al.* [31] reported 1.25 and 1.3% rate of rerecurrence, respectively, after recurrent inguinal hernia laparoscopic repair. Realizing that the standard technique was followed in all the included cases, there were some risk factors for which our higher incidence of rerecurrence could be attributed. One patient was obese with a BMI of 35, and the other has early regained heavy sport activity with lifting heavy weights during training. For suspected more complexity of the procedure, it was decided to manage these cases for the third repair using an open Lichtenstein repair after fixing the claimed factors for recurrence. Although our rerecurrence rate was higher than other rerecurrences compared with other studies, it was still within the overall inguinal hernia recurrence rate that range from 1 to 13% [4,10,32]. In a study by Niebuhr and Kockerling [33], they concluded that the discrepancy in the literature between the low and relatively high reported recurrence rates can be attributed to diversity in surgeons' experience and to the different coincident evidence-based influencing factors for

inguinal hernia recurrence. One other important factor is the discrepancy of the follow-up periods, as it was demonstrated that only 40% of recurrences occur with the first 5 years after the operation [34]. Consequently, comparison of different recurrence rates of inguinal hernia repair groups should have comparative circumstances to eliminate bias in the interpretation of results.

Conclusion

Relaparoscopic repair of recurrent inguinal hernia is a reliable and applicable procedure. Safety of the procedure is greatly dependent on skilled and well-trained hands for this procedure, with full awareness of the laparoscopic anatomy of the inguinal region.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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